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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/573,793

09/12/2006

Hidefumi Takaya

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KENYON & KENYON LLP  
1500 K STREET N.W.  
SUITE 700  
WASHINGTON, DC 20005

EXAMINER

QUACH, TUAN N

ART UNIT

PAPER NUMBER

2826

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DELIVERY MODE

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/573,793	<b>Applicant(s)</b> TAKAYA ET AL.	
	<b>Examiner</b> Tuan N. Quach	<b>Art Unit</b> 2826	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-22 is/are pending in the application.  
     4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 11-13 and 18 is/are allowed.
- 6) ☒ Claim(s) 1,3-6,8-10, 14-17, 19-22 is/are rejected.
- 7) ☒ Claim(s) 2 and 7 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 March 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
     a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. ____.                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>03/28/06</u> .  | 6) <input type="checkbox"/> Other: ____.                          |

### **DETAILED ACTION**

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1, 14, 16, 17 are 35 U.S.C. 103(a) as being unpatentable over Kinzer et al. 6,194,741 B1.

Kinzer et al., see particularly column 4 lines 49-60 and Fig.6, discloses an insulated gate type semiconductor device including body region 23, drift region 22, trench section 30, floating region 32, deposited oxide insulating layer 31 and gate electrode 34, a bottom of the trench section being arranged in the floating region, a lower end of the gate electrode being above the top of the floating region and a space between the bottom surface of the body region and the top of

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the floating region (about 1.4 micron as can be estimated) being obviously wider than a space (about 0.2 micron as can be estimated) between a lower end of the deposited insulating layer and a lower end of the floating region, lacks primarily the feature regarding the dimension or space between the lower end of the gate electrode and the lower end of the deposited insulating layer being wider than a space between the bottom surface of the body region and the top of the floating region.

It would have been obvious to one skilled in the art to have employed such feature in the device of Kinzer et al. since such corresponds to changes in size, proportion or relative dimensions within the purview of one skilled in the art. Such feature is deemed routinely determined by the skilled person, e.g., by trial and error, in accordance with circumstances, or by routine experimentation, e.g., to achieve a different breakdown voltage. In this respect, it is noted that no unexpected effects or properties would result from the incorporation of said in the device of Kinzer et al., as the instant application, see, page 17 line 20 to page 18 line 16, indicating that, essentially, the gate electrode should not face the floating region. Regarding the suitable dimensions or configurations in claims 14, 16, 17 such selection of suitable dimensions would have been within the purview of one skilled in the art. It is well settled that changes in size, proportion or relative dimensions would not be sufficient to patentably distinguish over the prior art absence showing of persuasive evidence that the particular configuration was significant. *In re Rose*, 220 F.2d 459, 105 USPQ 237 (CCPA 1955) (Claims directed to a lumber package "of appreciable size and weight requiring handling

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by a lift truck” where held unpatentable over prior art lumber packages which could be lifted by hand because limitations relating to the size of the package were not sufficient to patentably distinguish over the prior art.); *In re Rinehart*, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976) (“mere scaling up of a prior art process capable of being scaled up, if such were the case, would not establish patentability in a claim to an old process so scaled.” 531 F.2d at 1053, 189 USPQ at 148.). *In Gardner v. TEC Systems, Inc.*, 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied, 469 U.S. 830, 225 USPQ 232 (1984), the Federal Circuit held that, where the only difference between the prior art and the claims was a recitation of relative dimensions of the claimed device and a device having the claimed relative dimensions would not perform differently than the prior art device, the claimed device was not patentably distinct from the prior art device. *In re Dailey*, 357 F.2d 669, 149 USPQ 47 (CCPA 1966).

Claims 3-5, 9, 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kinzer et al. in view of WO 99/52152.

Kinzer et al. as applied above do not recite the auxiliary trench and auxiliary floating. '152 teaches Fig. 3, page 7 lines 7-18 the additional features, e.g., trench 4, and floating region 2.

It would have been obvious to one skilled in the art to have included said features in the device in Kinzer et al. to increase breakdown voltage of the device. Additionally, in the finished device the terminal trench section without gate electrode would be filled with an insulating layer for passivation as is well-known in the art. Regarding the depths in claims 4 and 5, these correspond to

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two obvious alternatives and such enumeration would have been obvious.

Regarding claim 9, the selection of suitable configuration would have been obvious. Additionally, it is well settled that changes in size, proportion or relative dimensions would not be sufficient to patentably distinguish over the prior art absence showing of persuasive evidence that the particular configuration was significant. Regarding claim 10, in addition to the reasons to claim 3 above, the provision of a termination region having a trench structure with floating regions similar to that of the cell region is a normal design option in the present technical field, see, e.g., '152, Fig. 4.

Claims 6, 8, 15, 19-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kinzer et al. in view of WO 99/52152.

Kinzer et al. are applied as above and lack the recitation of the auxiliary trench and floating region as in claim 6.

'152 teaches Fig. 3, page 7 lines 7-18 the additional features, e.g., trench 4, and floating region 2.

It would have been obvious to one skilled in the art to have included said features in the device in Kinzer et al. to increase breakdown voltage of the device. Additionally, in the finished device the terminal trench section without gate electrode would be filled with an insulating layer for passivation as is well-known in the art. Regarding the recitation regarding the space in claim 6 last three lines, such would be determined by routine experimentation to achieve the desired breakdown voltage. Regarding claim 20, in addition to the reasons to claim 6 above, the provision of a termination region having a trench structure with

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floating regions similar to that of the cell region is a normal design option in the present technical field, see, e.g., '152, Fig. 4. The selection of the desired configuration in claims 19 and 22, suitable depths in claims 8, 15, 21 would have been within the purview of one skilled in the art and would have been obvious. Additionally, it is well settled that changes in size, proportion or relative dimensions would not be sufficient to patentably distinguish over the prior art absence showing of persuasive evidence that the particular configuration was significant.

Claims 2 and 7 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 11-13 and 18 are allowed as the prior art does not teach or render obvious all the limitations of the claimed invention in claim 11 and as claims 12, 13, and 18 are properly dependent therefrom.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Yang 5,466,616 is made of record.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to examiner Tuan Quach whose telephone number is 571-272-1717. The examiner can normally be reached on M-F from 8:00 AM to 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor Sue Purvis can be reached on 571-272-1236. The fax

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phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Tuan N. Quach/  
Primary Examiner, Art Unit 2826